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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,402	10/28/2005	Ori Eytan	EYTAN2	5777

1444 7590 12/09/2008

BROWDY AND NEIMARK, P.L.L.C.
624 NINTH STREET, NW
SUITE 300
WASHINGTON, DC 20001-5303

EXAMINER	
ALUNKAL, THOMAS D	

ART UNIT	PAPER NUMBER
2627	

MAIL DATE	DELIVERY MODE
12/09/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/530,402	EYTAN ET AL.	
	Examiner	Art Unit	
	THOMAS D. ALUNKAL	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,11-19,21-23,25-28,31-37,39-42,44 and 48-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11-19,21-23,25-28,31-37,39-42,44 and 48-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-9, 11-19, 21-23, 25-28, 21-37, 39-42, 44, and 48-50 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 6-7, 11-19, 21-23, 25-28, 31-32, 34-35, 39-42, 44, and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hesselink et al. (hereafter Hesselink)(US 7,129,006).

Regarding claim 1, Hesselink discloses a method for use in recording/reading data from an array of data units within a three-dimensional storage medium, the method comprising (see Abstract and Figure 5D, Element 134): (a) providing exciting radiation in the form of first and second light beams of first and second different wavelengths, respectively (Column 3, lines 62-66 where the hologram recording condition and data writing condition are wavelength specific); (b) directing said first and second light beams and focusing them onto two sites in the medium at a predetermined distance between them, and collecting excited light of a third wavelength coming from the excited site in

the medium to form a third excited light beam and direct it towards a detector assembly (Figures 1A-1D and Figure 5D, element 160 where hologram recording is first performed followed by data recording), while correcting for chromatic and spherical aberrations of the light focusing and collection (Column 23, lines 20-23), said focusing comprising passing the exciting light beams through a focusing/collecting arrangement comprising two lens assemblies arranged in a spaced-apart relationship along an optical axis of the focusing/collecting arrangement (Figure 5D, Elements 154 and SAC Optics), one of said two lens assemblies being configured to perform the majority of light bending required for the focusing of the exciting light (Figure 5D, Element 154), and the other of said two lens assemblies being configured to carry out the majority of compensation for changing spherical aberration introduced by a change in a thickness of the medium into which the exciting light is being focused (Figure 5D, Element SAC Optics and Column 23, lines 20-23); (c) sequentially repeating step (b) for successive sites in the medium with varying depth of focus (Column 23, lines 44-47 where various areas are accessed in the same manner). Hesselink does not specifically disclose where the first and second light beams are concurrently focused onto the three-dimensional storage medium. However, it is noted that the first and second light beams of Hesselink are produced by separate, independent writing mechanisms.

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to concurrently focus the first and second light beams onto the three-dimensional storage medium of Hesselink, motivation being to reduce the overall

recording operation time while increasing the functionality of the optical data storage system which results in more efficient recording.

Regarding claim 2, Hesselink discloses wherein said collecting includes passing the excited light through the same focusing/collecting arrangement (Figure 5D, Elements 154 and SAC Optics where the return light follows the optical axis).

Regarding claim 3, Hesselink discloses wherein the focusing/collecting arrangement is configured and oriented relative to the medium and to light source and detector assemblies for focusing the exciting light beams to sites spaced from each other a predetermined distance and collecting the excited light from the excited site in the medium (Column 23, lines 19-20).

Regarding claim 4, Hesselink discloses wherein said two lens assemblies are accommodated in the optical path of the exciting and excited light beams, said one of said two lens assemblies being designed to perform the majority of light bending required for the focusing of the exciting light and for collecting the excited light (Figure 5D, Element 154).

Regarding claim 6, Hesselink discloses wherein that one of the two lens assemblies which is designed to compensate for changing spherical aberration is located closer to the medium (Figure 5D, Element SAC Optics).

Regarding claim 7, Hesselink discloses wherein each of said two lens assemblies comprises a single lens (Figure 5D, Elements 154 and SAC Optics).

Regarding claim 11, Hesselink discloses wherein said lens assembly located closer to the medium includes a flying lens (Column 21, lines 28-51).

Regarding claim 12, Hesselink discloses wherein that one of the two lens assemblies which is designed to perform the majority of light bending is located closer to the medium, the other one of the two lens assemblies being a multiple-lens assembly (Column 23, lines 24-25 and Figure 5D, Element SAC Optics where "Optics" suggests that the aberration correcting element is optionally a multiple-lens assembly depending on the type of spherical aberration correction needed).

Regarding claim 13, Hesselink discloses wherein the varying of the depth of focus comprises displacing at least one of the lenses of the focusing/collecting arrangement with respect to at least one other lens thereof along an optical axis defined by the focusing/collecting arrangement (Figure 5D, Element 154 which is movable along the optical axis).

Regarding claim 14, Hesselink discloses displacing the focusing/collecting arrangement with respect to the medium (Figure 5D, Element 154 which is movable along the optical axis resulting in a change of focus).

Regarding claim 15, Hesselink discloses wherein the varying of the depth of focus comprises varying the optical path lengths of the exciting light beams and the optical path of the excited light while propagating towards and away from the medium, respectively (Figure 5D, Elements 1 which is movable along the optical axis resulting in a change of focus).

Regarding claim 16, Hesselink discloses comprising displacing light sources, detector and focusing/collecting arrangement with respect to the medium (Figure 5D, Element 130 which is movable along the optical axis).

Regarding claim 17, Hesselink discloses displacing the medium with respect to the focusing/collecting arrangement ((Figure 5D, Element 154 which is movable along the optical axis resulting in a change of focus).

Regarding claim 18, Hesselink discloses pre-shaping the exciting beams so as to provide arrival of each of the excited beams to the focusing/collecting arrangement with a desired degree of the beam divergence/convergence, and post-shaping of the excited beam so as to provide the excited beam arrival at a detector assembly with a desired degree of the excited beam divergence/convergence (Figure 5D, Elements 148 and 166).

Regarding claim 19, Hesselink discloses wherein said pre-shaping comprises carrying out either a small or a large degree of divergence/convergence of each of the first and second exciting light beams arriving at the focusing/collecting arrangement, thereby providing, respectively, either semi-infinite or finite conjugation of the first and second beams (Figure 5D, Elements 148 which collimates first and second beams exiting the light source).

Regarding claim 21, Hesselink discloses passing each of the first and second exciting light beams through a lens assembly appropriately designed and oriented with respect to a corresponding light source to provide the desired degree of the beam divergence/convergence (Figure 5D, Element 148).

Regarding claim 22, Hesselink discloses accommodating the focusing/collecting arrangement at certain distances from first and second light sources generating said first and second light beams, to provide the desired degree of divergence/convergence

of each of the first and second light beams when arriving at the focusing/collecting arrangement (Figure 5D, Elements 148 which collimates first and second beams exiting the light source).

Regarding claim 23, Hesselink discloses wherein said pre-shaping comprises carrying out one of the following: collimating one of the first and second exciting light beams and providing a small degree of divergence/convergence of the other of said first and second exciting beams when arriving at the focusing/collecting arrangement so as to provide semi-infinite conjugation of said other beam; or collimating each of said first and second exciting light beams, while propagating towards the focusing/collecting arrangement (Figure 5D, Elements 148 and 166 which collimate both light entering and exiting the storage medium).

Regarding claim 25, Hesselink discloses wherein that one of the two lens assemblies of the focusing/collecting arrangement that is located closer to the medium is kept at a constant distance from the medium, and at least one other lens of the focusing/collecting arrangement is movable along the optical axis (Figure 5D, Element 154 which is movable along the optical axis and Element SAC Optics which is held at a constant distance from the storage medium).

Regarding claim 26, Hesselink discloses wherein said multiple-lens assembly comprises three lenses arranged in a spaced-apart relation along the optical axis (Figure 5D, Element SAC Optics where "Optics" suggests that the aberration correcting element is optionally a multiple-lens assembly depending on the type of spherical aberration correction needed).

Regarding claim 27, Hesselink discloses wherein said varying of the depth of focus comprises moving an intermediate one of said three lenses along the optical axis (Figure 5D, Element 154 which is movable along the optical axis resulting in a change of focus depth).

Regarding claim 28, Hesselink discloses wherein said first and second exciting beams are operated to carry out one of the following: the first and second beams are respectively reading and recording light beams; the first and second exciting beams are reading light beams; and first and second exciting beams are recording light beams (Column 3, line 62-Column 4, line 12).

Apparatus/system claims 31-32, 34-35, 39-42, 44, and 48 are drawn to the apparatus/system corresponding to the method of using same as claimed in claims 1-4, 6-7, 11-19, 21-23, and 25-28. Therefore apparatus/system claims 31-32, 34-35, 39-42, 44, and 48 correspond to method claims 1-4, 6-7, 11-19, 21-23, and 25-28, and are rejected for the same reasons of obviousness as used above.

Regarding claim 49, Hesselink discloses performing shaping of each of said exciting beams to arrive at the focusing/collecting arrangement with predetermined degree of divergence/convergence (Figure 5D, Elements 148 which collimates first and second beams exiting the light source).

Regarding claim 50, Hesselink discloses performing shaping of the collected excited beam emerging from the focusing/collecting arrangement to provide predetermined degree of divergence/convergence of said collected excited beam

(Figure 5D, Element 166 which collimates first and second beams entering the detector).

Claims 5 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hesselink, as applied in claims 1-4, 6-7, 11-19, 21-23, 25-28, 31-32, 34-35, 39-42, 44, and 48-50 above, and further in view of Applicant's Admitted Prior Art (AAPA).

Regarding claim 5, Hesselink does not specifically disclose wherein said lenses of the focusing/collecting arrangement have different surface geometries, at least one of these surfaces being aspheric. However, AAPA discloses a method and apparatus for adjustable spherical aberration and focusing. The apparatus includes an aspheric lens used to provide accurate focusing and positive spherical aberration (Page 3, line 19-Page 4, line 2 of Applicant's specification).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to provide the aspheric lens surfaces of AAPA to the aberration correcting elements of Hesselink, motivation being to provide accurate focusing on the storage medium while producing positive spherical aberration.

Claim 33 recites limitations similar to those in claim 5 and is rejected for the same reasons of obviousness as used above.

Claims 8, 9, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hesselink, as applied in claims 1-4, 6-7, 11-19, 21-23, 25-28, 31-32,

34-35, 39-42, 44, and 48-50 above, and further in view of Kojima et al (hereafter Kojima)(US 6,366,542).

Regarding claim 8, Hesselink does not disclose wherein that one of the two lens assemblies which is designed to perform the majority of light bending is configured to define two lens portions of different materials and geometries. In the same field of endeavor, Kojima discloses an optical pickup apparatus that includes an objective lens composed of a plurality of lenses where at least one lens is made of plastic which results in a reduction of both cost and weight of the objective lens (Column 63, line 66-Column 64, line 4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to provide the objective lens configuration of Kojima to the spherical aberration correcting apparatus of Hesselink, motivation being to reduce the cost and weight of the apparatus.

Regarding claim 9, Kojima also discloses wherein said lens portions are separate lens elements arranged in a spaced-apart relationship along the optical axis and are arranged either with a gap between them or being attached to each other (Column 63, line 66-Column 64, line 4).

Claims 36, and 37 recite limitations similar to those in claims 8 and 9, respectively, and are rejected for the same reasons of obviousness as used above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. McDonald et al. (US 6,091,549) discloses a method and apparatus for adjustable spherical aberration correction and focusing. Shiono et al. (US PgPub 2002/0060959) discloses an optical information recording and reproducing apparatus. Maeda et al. (US 5,303,221) discloses an optical pickup for an optical reproducing system. Kimura (US PgPub 2003/0067861) discloses an objective lens. Glushko et al. (US 6,291,132) discloses a fluorescent optical memory. Yamamoto et al. (US 6,721,259) discloses an optical head and recording/reproducing device. McDonald et al. (US 6,064,529) discloses spherical aberration correction using a flying lens. Daiber et al. (US 6,288,804) discloses a positive unit magnification reflective optics for holographic storage.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS D. ALUNKAL whose telephone number is (571)270-1127. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571)272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas D Alunkal/
Examiner, Art Unit 2627

/Wayne Young/
Supervisory Patent Examiner, Art Unit 2627